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Kenton C. Lint

BULLETINS

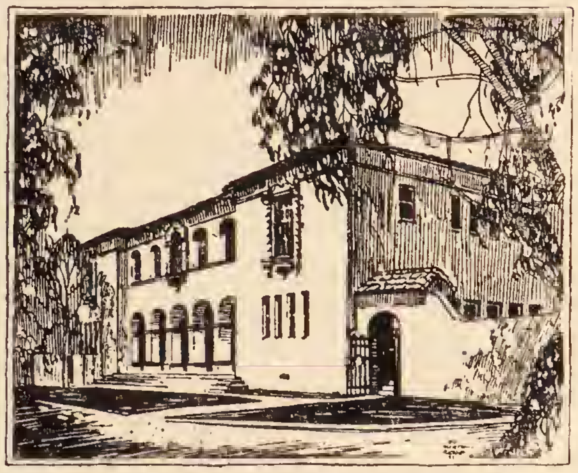
OF THE

Zoological Society of San Diego

No. 27

Breeding Ocellated Turkeys In Captivity

By KENTON C. LINT
Curator of Birds, Zoological Society of San Diego



SAN DIEGO, CALIFORNIA

September 12, 1952

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ILLUSTRATIONS

Page

Nest of Ocellated Turkey 11

Comparison of eggs: Ocellated Turkey, Reeve's Pheasant 12

First hatching of Ocellated Turkey in San Diego Zoo, June 20, 1948 13

Ocellated Turkey chick—4 days old 15

Ocellated Turkey chick—14 days old 16

Ocellated Turkey chick—28 days old 18

First display of ocellation—77 days old 19

Immature Ocellated Turkeys—112 days old 20

Young Ocellated Turkey—150 days old 21

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INTRODUCTION

Because of the interest displayed in the successful raising of Ocellated Turkeys in the Zoological Garden of San Diego, Kenton C. Lint, Curator of Birds at the zoo, has been asked to prepare a rather detailed account of the experience he has had in this particular field. In preparing this record of the methods followed and results attained with this rare bird in the Zoological Garden of San Diego we have recorded the failures as well as the successes, because many of the well known practices followed by zoos and by successful game bird breeders, generally, have not, under the best conditions possible in the zoological garden, met with success in breeding this particular fowl.*

This is the first official paper published by the Bird Department of the Zoological Society of San Diego. Many previous outstanding successes in the breeding of wild birds in captivity have, however, been recorded by the author and his predecessors, Carl Ring and Karl Koch, in publications of the aviculture societies and game-bird breeders, as well as in the Zoological Society publication, Zoonooz.

We are purposely making this an informal and non-technical paper so that it will be of greatest benefit to those who would profit most by it, the average game-bird breeder who is more interested in facts than technicalities.

For those who are not familiar with the Ocellated Turkey, one of the most beautiful and rare of all birds of this group, we have briefly recounted its first introduction into aviaries and explained how a few American zoos came into possession of Ocellated Turkeys in 1946.

The management of the Zoological Garden of San Diego wishes to express its gratitude to the University of California, College of

* Since this bulletin went to press, word has been received that Mr. Siewertz Van Reesema, Director of the zoo at Rotterdam, obtained fifteen fine poults from a pair of Ocellated Turkeys he had acquired from the Zoological Garden of San Diego.

Agriculture, and more specifically to the Division of Poultry Husbandry. That department has made possible the raising of these rare birds by the use of artificial insemination.

To Dr. V. S. Asmundson, who both before and after the arrival of the Ocellated Turkeys offered to the staff at the zoo the skill and knowledge of his institution, we are most grateful. To Dr. Frederick W. Lorenz, who flew down repeatedly to perform the insemination whenever called upon, we are particularly indebted for his skill and immediate attention to our problems. Without this cooperation and assistance, the breeding of any number of Ocellated Turkeys from the collection brought into the United States in 1946 would, we believe, never have been accomplished.

BELLE J. BENCHLEY

BREEDING OCELLATED TURKEYS
IN CAPTIVITY

The Ocellated Turkey, *Agriocharis ocellata* (Cuvier) *(1)* of Central America, has been known to ornithologists for over a hundred years, but the first living specimens were collected by Charles Cordier in Guatemala in 1938. Eleven birds were delivered to Captain J. Delacour at Cleres, France, who sent some of the rare birds to Mr. Spedan Lewis in England. Mr. Cordier has written an interesting account of this experience in the magazine, "Aviculture," *(2)* July-August, 1943. Mr. Lewis reared five of these turkeys in 1943 which appears to be the first official record of breeding the Ocellated Turkey in captivity.

In its natural habitat the Ocellated Turkey is a resident of the tropical forests of the lowlands of the Petén district of Guatemala (Yaxa, Uaxactún, Pacomón, and Dos Arroyos) and adjacent parts of British Honduras (Belize, Western Districts) and of Yucatán (Buctzotz, Acomal, eastern Quintana Roo, Chichen Itzá, Mérida, Epista, Rio Lagartos La Vega, Calotmal, Tomax, and Valladolid), and of Campeche (Pacaitun, Apazote, La Tuxpena, and Yahaltun) *(1)*.

Until 1946 there were no living specimens of the Ocellated Turkey in the United States. The very few in England remained in the possession of Mr. Spedan Lewis who had received his first birds in 1938, eight years before.

Cordier explains that scarcity of these birds in collections is accounted for first, by the difficulty with which the birds can be captured and transported after they have been caught, and finally, by the failure to raise the chicks hatched in captivity. In 1942 Mr. Lewis' birds produced quite a number of fertile eggs but practically all of those hatched died before reaching maturity. The Ocellated Turkey appears to be delicate and mortality in young poults high, even when kept on wire and under the most favorable conditions. Cordier writes *(2),* "Twice in the field I came on a hen which had but one single, well-grown chick, which gives one an idea of the mortality which occurs in the wild, not only from the attacks of natural enemies, but as the result of the flooded ground which is present during the better part of the breeding season. If even a third of the young hatched were to survive, the birds would be present in thousands instead of in small numbers whenever they are found today."

Some fifty years ago, a Dr. Guamer, spurred on by an offer of six hundred dollars for every Ocellated Turkey delivered alive in Paris, traveled to Yucatán where he bought four hundred and thirty eggs from natives. About four hundred eggs hatched, but only two birds eventually survived.

In 1946 Charles Cordier and Dr. D. S. Newill, of Connellsville, Pennsylvania, collected and imported a new lot of Ocellated Turkeys from Central America. This importation was participated in financially by several zoological gardens in the United States. Two of these birds, a young pair, were received at the Zoological Garden of San Diego on October 26, 1946. The age of this pair was estimated at between six and eight months old.

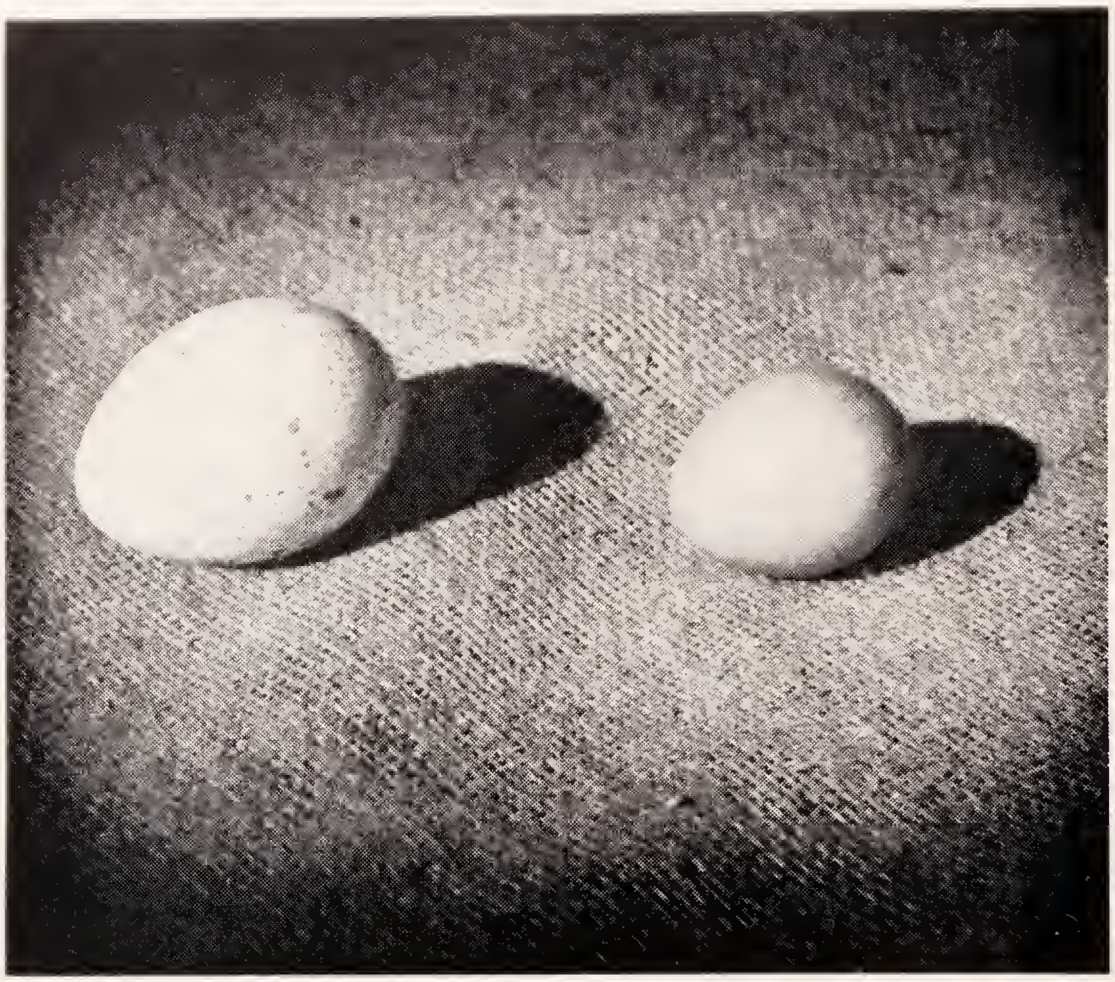
Early in the spring of 1947 the birds were put on exhibition in a group of breeding pens. As the mating season neared, the male bird began to display and became very pugnacious, quite in the manner of the Java Green Peafowl. The female selected a secluded spot for her nest and made a slight depression in the ground, into which she scratched a few dry leaves in a way quite similar to the nest of the domestic turkey. A typical brush pile was provided under which the hen laid her clutch of eggs.

Unfortunately, the breeding pens in the zoo were not at that time rat-proof, being constructed with a dirt floor through which rodents could easily tunnel. It was necessary, therefore, to collect the eggs every day rather than risk the destruction of anything so valuable as these eggs. For fourteen successive days the hen laid her eggs between four and five p.m. each day, being completely consistent in going to her nest at this particular time. Of course, artificial eggs were supplied as nest eggs to keep her laying as long as possible. Her eggs were quite typical turkey eggs, perhaps a little smaller than domestic or wild North American turkeys and with larger blotches.

Nest of Ocellated Turkey

The male bird was actually very mean and quarrelsome. Whenever anyone approached the nest he would fly straight into his face clear across the greatest length of the pen, without a bit of warning. In fact, it was necessary for a second man to enter the cage for the proection of the one collecting the eggs. The long sharp spurs could easily have inflicted a considerable injury to anyone coming in contact with them.

It was on May 9th, 1947, that the first Ocellated Turkey egg was laid by the zoo hen. In all, twenty-one eggs were laid in 1947 and every one of the eggs was infertile. Both artificial and natural incubation were tried with these twenty-one eggs without any success. The male bird was slow, possibly, in reaching maturity although he displayed that summer and had finally reached beautiful adult plumage. He had, moreover, when he was received at the zoo, a badly crippled leg, which had been vigorously protested at the time of his arrival. This condition might have been due either to an injury or a diet deficiency as a poult. It could also easily have been the cause of his failure to mate properly.



Comparison of eggs: Ocellated Turkey (left), Reeve's Pheasant

The Division of Poultry Husbandry of the University of California had been exceedingly interested in the importation of these turkeys and had been in touch with the zoo regarding them, even prior to their actual arrival. Through Mr. Bernarr Hall, of the County Department of Agriculture in San Diego, use of artificial insemination had been discussed. Consequently, after the failure to hatch in 1947, it had been decided, at the zoo, that artificial insemination would be resorted to in the breeding season of 1948 if the eggs should again prove infertile. As soon as the hen began laying in the 1948 season the eggs were again removed immediately and tested by artificial incubation. The first ten thus tested proved infertile and the zoo quickly contacted Dr. W. S. Asmundson at the College of Agriculture of the University of California and Dr. Frederick W. Lorenz, of the same institution, a master in the technique of insemination in poultry. They had suggested the experiment and repeatedly offered their help. Dr. Lorenz flew to San

Diego immediately so as not to lose any precious time. He was assisted in this artificial insemination by Dr. Arthur L. Kelly, veterinarian on the zoo staff, as well as the author.

On May 21, 1948, the first insemination was made by Dr. Lorenz with surprisingly little difficulty, considering the usual wildness of the birds. Since artificial insemination is a well known process, in common practice, we will not go into details of the method or describe the process used by Dr. Lorenz *(3)*. The first fourteen eggs following the first insemination were successfully incubated. The fourteen Ocellated Turkeys thus hatched were possibly the first to be hatched in United States, and without doubt the first by this method. The incubation period was twenty-eight days.

Both natural and artificial incubation were used in hatching the Ocellated Turkey eggs. The eggs in the incubator were turned three times each day by hand. It was found that the poults hatched with natural incubation under a broody hen were a little stronger and dried faster than the incubator poults. One of the problems encountered,

First hatching of Ocellated Turkey in San Diego Zoo, June 20, 1948 however, was that the hen foster-mother had trouble covering even four or five poults at six or seven weeks because of their size.

The poults were so susceptible to colds at any age that this danger was always present, to be guarded against constantly. Our experience indicates that dampness or foggy weather, and especially drafts, can quickly cause the death of Ocellated Turkeys while they are poults.

In hatching by artificial incubation one incubator cannot be recommended in preference to all others because of the great variety of reliable ones manufactured. The incubator used in the Bird Department of the Zoological Garden, however, was manufactured by a local firm, The Lyon Electric Company. It was given to the zoo and adjusted to the peculiar needs of the zoo as a contribution to the work on an experimental basis. This same machine is used successfully for many types of eggs, varying from those of pigeon and quail, to Emu, Ostrich and Andean Condor.

In incubating the Ocellated Turkey eggs the temperature was held at 99° to 100° F for the first three weeks. The fourth week the temperature was raised to 101° F. Moisture or humidity, equally important, was held at a hygrometer reading of 87-88 percent for the best results.

The poults were usually kept in the incubator for eight hours after hatching appeared to be completed, but any weak poults were held longer in the incubator until they gained more strength.

In removing the poults from the incubator they were carried to the brooder in a cloth lined basket or box, taking care not to squeeze, drop or chill them, for they are very delicate when first hatched and any slight injury may be fatal.

The brooder had been turned on preparatory to receiving the poults. The brooder temperature was held between 94° F - 95° F for the first week of brooding and was gradually lowered 5° F each week until the poults were four weeks old.

The poults were not fed until they were twenty-four hours old, for the yolk of the egg absorbed just before the poults hatched furnished sufficient nourishment. This point is stressed, although it is generally well known, because the yolk of the egg must be thoroughly digested before the first feeding is given. Too many beginners, not understanding this fact, are anxious to feed young poults, and do give them food before they are ready for it. Such practice invariably results in intestinal

Ocellated Turkey chick—4 days old

complications and frequently in the death of the poults. Teaching Ocellated poults to eat by themselves in the brooder was the greatest problem. All of the old poultryman's tricks to induce the babies to eat were employed with little success. Many hours were spent and even night feeding was necessary to raise the first Ocellated poults.

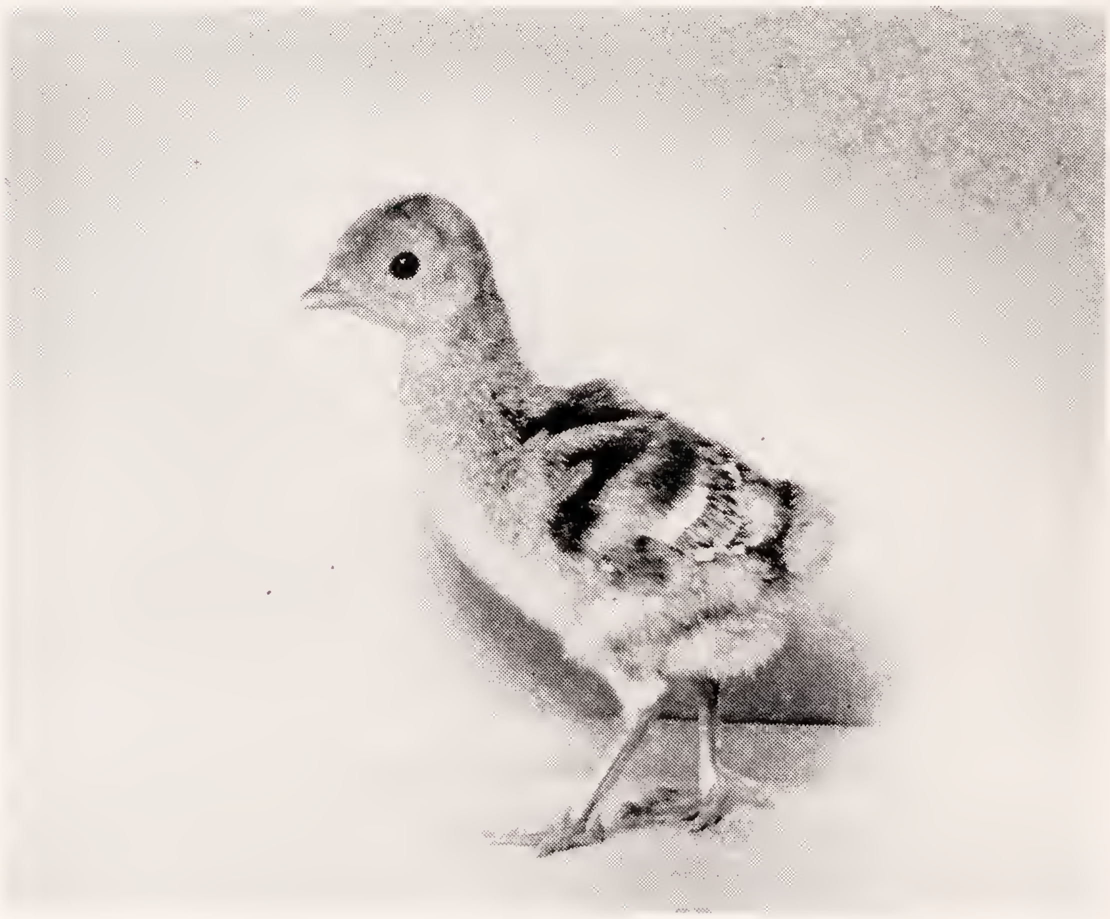
A good turkey starting mash supplemented by shredded green food was offered for a starting diet. A little of the green food was eaten, but very little indeed, and the starting mash was untouched. For the first four weeks insect food was practically all that kept them alive, since they refused the mash and ate insufficient green stuff to grow properly.

Each morning and evening a small quantity of freshly prepared egg yolk was sprinkled over the mash as a supplement. It is important that no more of this egg yolk be fed at one time than will be eaten quickly. In warm weather, especially, it spoils quickly and can easily cause the death of a bird. These Ocellated poults paid no attention whatsoever to this egg yolk day after day when it was sprinkled on the turkey starting mash. Both small millet seed and canary seed were offered separately and in the mash with no success. These failures are mentioned because they are logical items in common usage with other birds and domestic fowl.

Many green foods were used in raising our poults, principally tender lettuce, dandelion leaves, chickweed, swiss chard, clover, alfalfa leaves, young carrot tops, and even cabbage leaves and grass cuttings. All leaf greens were finely cut so the poults would not swallow long blades or large pieces that could possibly cause impaction in the crop.

For the first four weeks the Ocellated poults lived almost entirely on insects, and fourteen babies do eat a lot of insects each day. Mr. Cordier, when collecting and feeding the young Ocellated Turkeys in Guatemala, reports that he fed termites to his young birds, and fortunately the supply of termites in that area seemed to be unlimited.

Common Cockroaches *(Periplaneta orientalis)*, which are now found in almost all parts of the world, were also fed, as well as the



Ocellated Turkey chick—14 days old

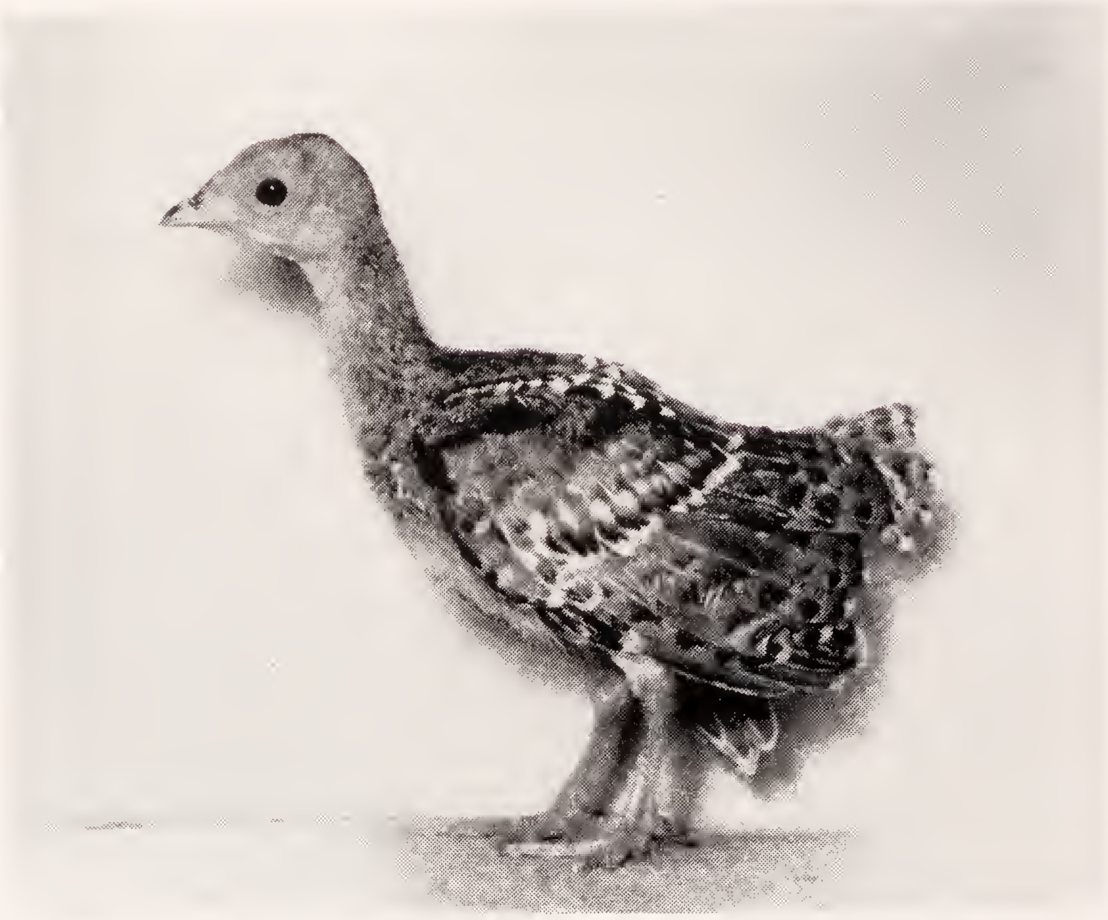
American Cockroaches *(Periplaneta americana)*, somewhat larger than the Common species. Although both Bird and Reptile Departments in the San Diego Zoo raise and keep cockroaches as a source of insectivorous food the supply was soon depleted in both departments. Actually, the birds consumed twenty cockroaches per bird, three times each day — eight hundred and forty cockroaches a day.

In addition to the cockroaches, the poults were fed corn ear worms *(Heliothis obsoleta)* picked off of the ears of the green corn being fed to other birds in the collection. As the cockroach supply became scarcer each week it became necessary to use other insect food for the poults and mealworms were the last source of supply. Mealworms, the larval form of a common beetle *(Tenebrio molitor)*, pest of flour, meal, grain, and related products, are almost cosmopolitan in range. They vary in size from the very small, newly hatched larvæ, to about an inch in length at the time they enter the intermediate or pupal stage.

Readily accepted by nearly all insectivorous birds, mealworms are the mainstay of aviculturists desiring an easily obtainable supply of live food. They form, as well, an important staple of diet for various kinds of insectivorous mammals, amphibians, reptiles and fish in captivity and though small in size have come to be an important commercial food item. Mealworms are richer in food value than many insects, and the Ocellated Turkeys thrived on them. As long as the feeding of mealworms continued the number was limited to thirty per bird daily because of the high food value.

At five weeks of age the poults seemed suddenly to be seeking new food and finally began to eat the starting mash, the egg yolks and tender green forage greedily. Most of the ingredients necessary to proper growth and feeding are to be found in this mixture. This change of appetite marked a turning point. Feeding became much easier and the growth and development of the birds was noticeably steady week by week. Dried bread crumbs were added to their regular food, also, but mealworms remained a substantial part of their diet. At six weeks fresh green corn on the cob was added. The ears of corn were supported by nails driven into the sides of the pen. Uneaten parts were removed once or twice a day to keep the wire floor from becoming littered.

At seven weeks the poults became wild and very nervous and were so excitable that it was difficult even to take their pictures. A pan of fresh clean sand was introduced into the pen which was freely used by



Ocellated Turkey chick—28 days old

the birds. It was cleaned each morning. At eight weeks the change from starting mash to growing mash was made without difficulty. A patented growing mash was added to the regular green food, canary seed, green corn, dried bread, egg yolk and mealworms. For several weeks the turkeys did well on this and at eleven weeks a little ground raw meat was added. Care had thus been taken at all times to provide the six essential food elements. These nutrients, water, protein, carbohydrates, fats, minerals and vitamins all seemed to be provided in proper proportions by the diets herein described.

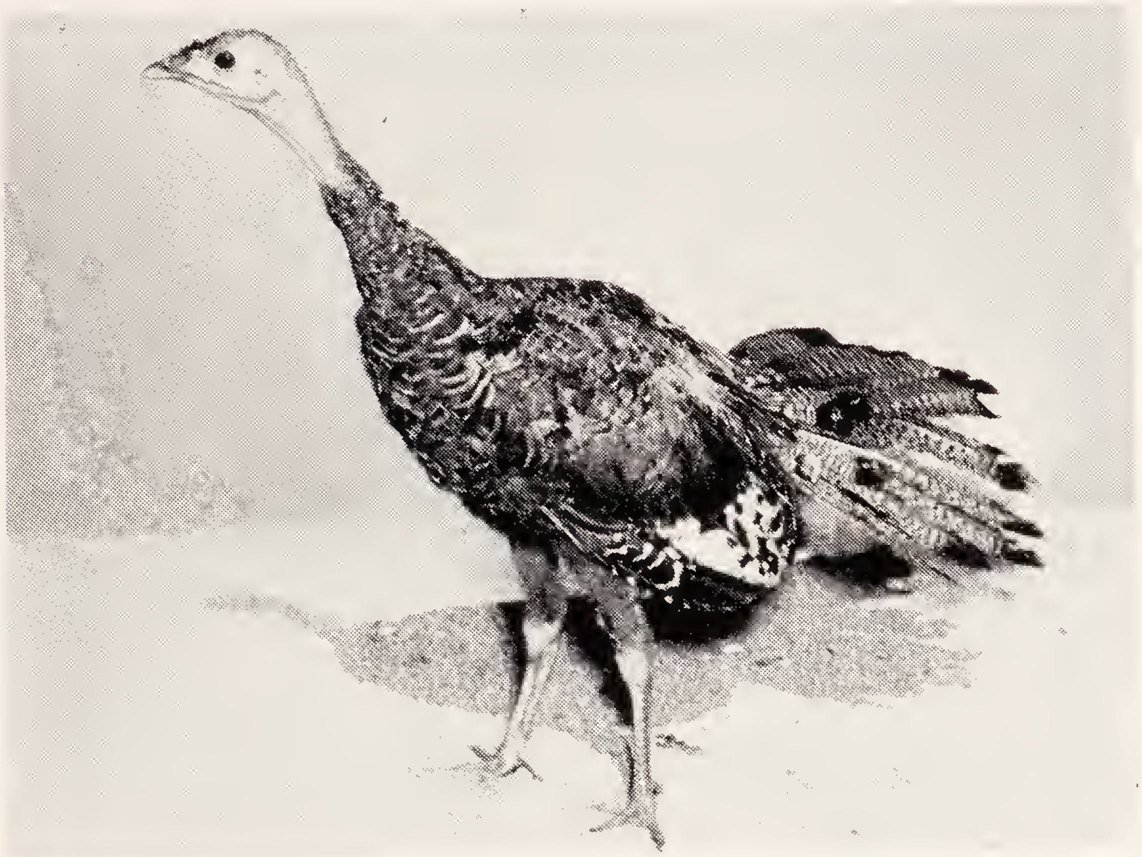
Feather pulling, fighting and general cannibalism are often prevalent among young poultry at this age. Such trouble is known to have been prevented by feeding meat at this period. Feeding a bit of ground meat daily with the regular diet was continued and this combination carried them satisfactorily up to the age of five months. Fifteen and a half grams of ground meat was the average for each bird daily.

Weather conditions certainly appeared to have an important part in the success or failure of this work. The poults appeared to thrive best during long intervals of bright sunshine. Regularity in feeding also proved to be a real necessity in raising Ocellated Turkeys. They required much attention throughout their entire growth-period.

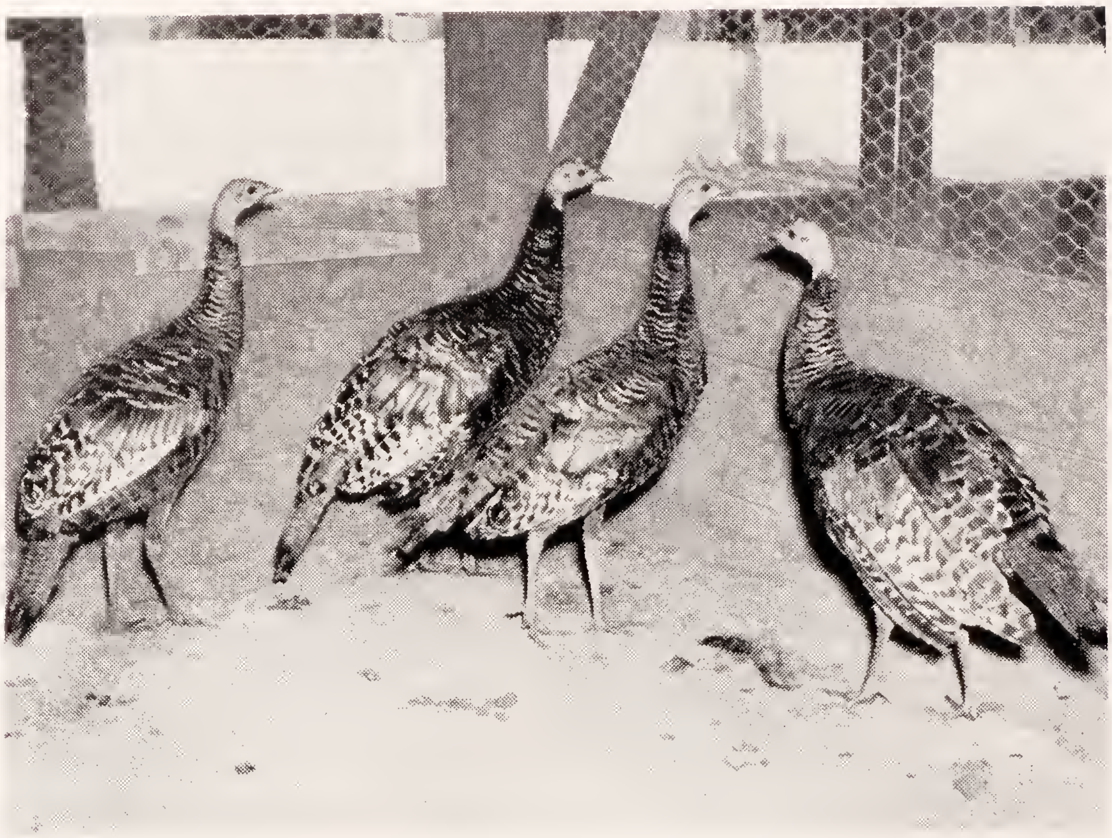
In each of the following successful seasons both turkey starting mash and turkey growing mash have been used in raising all the Ocellated poults in the zoo. The first is especially valuable for its high protein content of 22% and ground limestone is found in both mashes in such proportion that no further supply is needed. Fresh water was supplied liberally, and the best containers during the entire growing period have been the glass chick waterers, the size being changed as necessary.

Since the Ocellated Turkey is highly susceptible to the diseases of captivity extreme care must be taken to keep the quarters exceptionally clean and sanitary. Water containers and quarters must be kept not only clean but free from mould, flies, ants or any other form of disease carriers.

Because this is the first extensive experience with breeding and raising Ocellated Turkeys in the United States, the infant and juvenal



First display of ocellation—77 days old



Immature Ocellated Turkeys—112 days old

plumages may not be generally known. Therefore, a brief account of the early physical development and plumage changes may be of interest. For this reason brief comments on the changing appearance from notes made at various intervals are here included.

At six weeks, buttons for spurs were noticeable; the warts on the forehead made their appearance; the skin on the neck and ear remained gray as when hatched.

At seven weeks, the color on the top of the head changed to a light blue and true tail feathers were appearing.

During the eighth and ninth weeks the head grew deeper blue and some real iridescence was evident on the tail covers for the first time.

Ocelli feathers made their appearance at eleven weeks.

At nineteen weeks the sex of the poults was indicated by the development of a fleshy knob above the beak on the male birds.

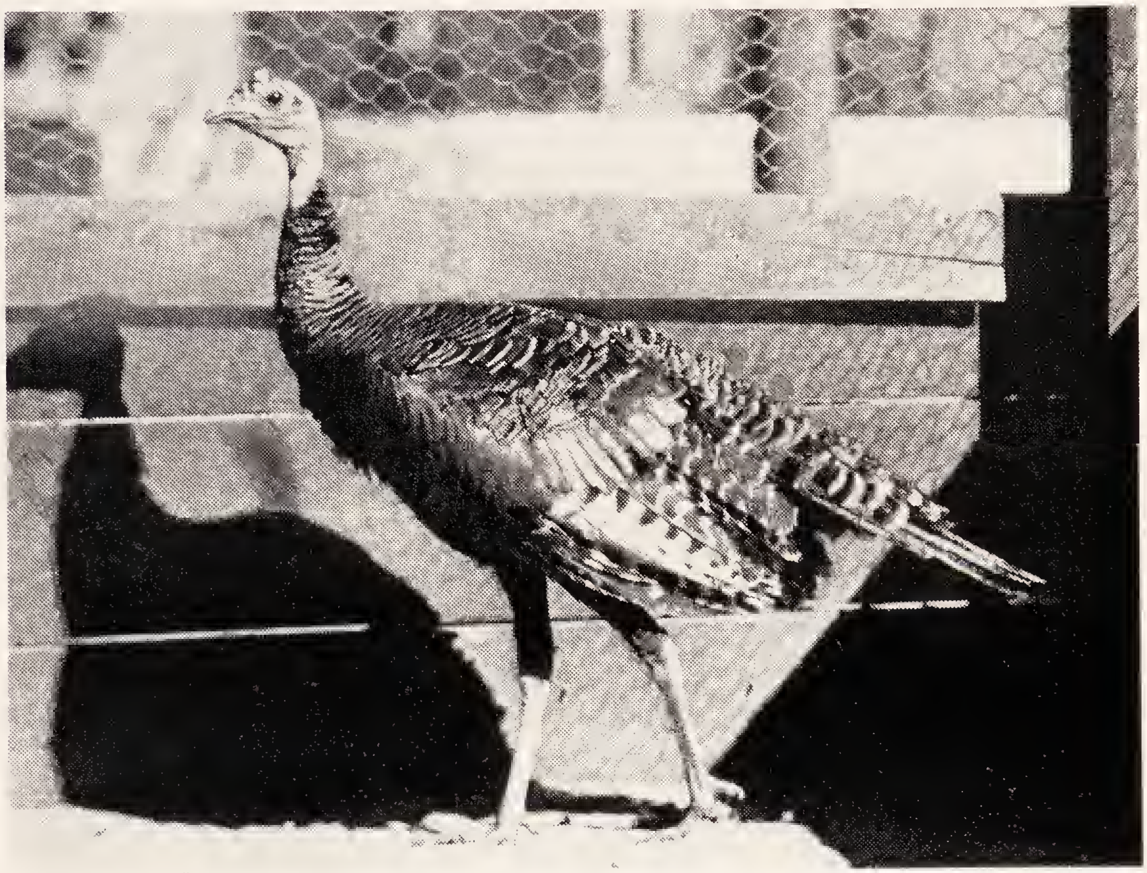
At five months old the poults were smaller editions of the adult bird, with slightly duller plumage.

The progress of molts in wild and domesticated turkeys are almost identical in their entirety, with four distinct plumage changes. The natal down, juvenal, adult female and adult male plumages are also well described by Friedmann *(1)*.

The first successful natural fertilization of eggs at the Zoological Garden was with male birds two years old from the 1948 hatch.

Natural incubation by an Ocellated Turkey hen has been a failure to date because of their refusal to set, even on a good clutch of eggs. The records of the continued experience with the raising of Ocellated Turkys are included in a brief summary appended to this paper.

As for the future, the Zoological Society of San Diego plans to establish a number of breeding pens within the zoo, hoping thus to maintain a sufficiently large number of birds to insure the continued existence of the Ocellated Turkey which appears to be threatened with extinction in the wild. The number estimated as necessary has not as yet been attained and until it is reached, the policy of disposing of what might seem to be surplus birds from the standpoint of a zoological exhibit will be limited to the distribution of a very few specimens, among zoos or individuals carefully selected.



Young Ocellated Turkey—150 days old

This is especially necessary since the birds of the second or even the third generation continue to be wild under certain circumstances, such as catching them for shipment. Even shifting to other pens frequently brings disasters. The success of the work here at the zoo has not been commensurate with careful research and planning, nor the diligent efforts and hard work based on past experience that have gone into it. In fact, at times the results seem most discouraging to those actually engaged in it. However, it has been carried on in the hope that this success will stimulate greater endeavors among other breeders and exhibitors and perhaps a further increase in wild importations as well as improved methods of handling.

As of this date, also, the results which have been achieved from San Diego Zoo bred turkeys that have been sent to game-bird breeders or other zoos, have been most disappointing in the lack of increase of specimens and does not as yet justify further depletion of any of the small breeding groups now in the zoo, that have been developed from the two specimens received at the zoo in 1947.

In interest of brevity the author is appending to this account a summarization of main facts contained in this paper, and adding in tabulated form experiences from four successive successful years, the first two of which depended entirely upon artificial insemination, the last two being the recordings of the success with only natural matings from two year old, zoo bred cocks.

SUMMARY

1. The Zoological Society of San Diego has hatched and raised the first Ocellated Turkeys of Guatemala, Yucatán, and British Honduras, by use of artificial insemination in the United States.
2. On May 21, 1948, the first insemination was made by Dr. Frederick W. Lorenz, Poultry Husbandry Division, University of California, Davis, California.
3. Fourteen fertile eggs resulted between May 21 - June 4, 1948.
4. The first Ocellated Turkey poults were hatched June 20, 1948, and fourteen poults were subsequently hatched.
5. The period of incubation was twenty-eight days.
6. The eggs are similar to the domestic turkey egg with larger spots.

7. The average egg weighed 47.19 grams and measured 60.76 x 44.2 mm.
8. The Ocellated Turkey hen at the San Diego Zoo laid thirty-seven eggs during the nesting season in 1948.
9. Five Ocellated Turkeys were raised to maturity in 1948.
10. On May 13, 1949, the insemination was made by Dr. Lorenz for the second year with the original pair.
11. Twenty-nine eggs were laid between May 12 - June 12, 1949. Sixteen Ocellated Turkeys were raised to maturity in 1949.
12. In 1950 nine Ocellated Turkeys were raised through natural matings from second generation zoo bred males.
13. Eleven Ocellated Turkeys were raised to maturity in 1951 without the use of artificial insemination.
14. Forty-one Ocellated Turkeys have been hatched and raised by the Zoological Society of San Diego in four years.
15. May has been the breeding month for Ocellated Turkeys in San Diego.
16. Eggs are incubated at the temperature of 99° F - 100° F, for the first three weeks and 101° F for the fourth week, with a humidity of 87-88 percent.
17. During the first four weeks the poults lived exclusively on insect food, chiefly cockroaches and mealworms.
18. At five weeks poults began eating turkey starting mash, canary seed, millet seed, greens, bread crumbs, egg yolk and insects.
19. Adult Ocellated Turkeys are fed green oat pellets, canary seed, millet seed, milo maize, bread, egg yolk, every form of greens, and ground meat. Oyster shell is added during the breeding season.

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